

App. No. 10/707,104
Amendment dated October 24, 2005
Reply to Office action of June 24, 2005

Amendments to the Drawings:

The attached drawing sheets include a change common to both Fig. 13A and Fig. 13B. These sheets replace the original sheets containing Figs. 13A and 13B.

In Figs. 13A and 13B, the addition of the legend "Prior Art" has been indicated.

Attachment: Replacement Sheets
Annotated Sheets Showing Change

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REMARKS

Summary of Amendments

Claims 1, 3, 5, 6, 7, 9, 11-13 have been amended to add limitations, in independent claims 1, 7 and 13 in particular, setting forth that a *spiral* airflow is generated by the rotation of the impeller blade as recited therein, and in dependent claims 3 and 9, setting forth that the rib groups composing the guard plate extend *linearly* in substantially perpendicular directions.

No claims have been cancelled; accordingly claims 1-13 remain pending.

Drawings

Two drawing replacement sheets attached to this paper correct Figs. 13A and 13B by the addition of the legend "Prior Art" to each, as required by the Examiner.

Rejections under 35 U.S.C. § 103

In order to best address the present rejections, Applicant presents below an overview of the technical significance of the present invention.

Finger guards for fans are generally used to prevent fingers or other objects from entering the fan interior space and, in the case of the fingers, becoming injured. In order to realize this guarding function, finger guards are provided with a mesh grid formed by ribs extending in at least two directions, with the ribs being fixed to each other at the intersections. The airflow generated by the rotation of a fan is consequently exhausted (or taken in) by such a finger guard as mounted on the fan, wherein the airflow cannot pass the finger guard smoothly, leading to decreased cooling efficiency of the fan. In other words, conventional fans provided with finger guards sacrifice the cooling efficiency of the fans for the guard function.

The present invention relates to the improvement of the airflow through such fan guards. None of the prior art, including the Maruyama et al. '271, Branson '460, Price '534, and McAnally et al. '566 references, relates to improving the airflow through a fan guard in the manner of the present invention.

In particular, the purpose of the present invention is reducing loss in airflow in cooling fan structures in which the loss is due to a finger guard or similar guard plate. A guard plate according to the present invention is provided as a finger guard constituted by a plurality of ribs, each rib having at least one inclined side in cross

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section substantially parallel to the direction of the airflow at the location of the ribs, generated by rotation of the impeller blade. The inclined side of the ribs is oriented so as to align with the orientation of the airflow flowing spirally from the front of the fan.

As a result, the present invention realizes the minimization of interfering airflow caused by the finger guard, which increases the airflow efficiency and cooling efficiency without sacrificing the function of the finger guard.

Claims 1-3 and 5: Maruyama et al. '271 in view of Branson '460

Claims 1-3, and 5 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,603,271 to Maruyama et al., in view of U.S. Pat. No. 1,313,460 to Branson.

Maruyama et al. discloses fixed blades 4 that are integrally molded with the base plate of a fan motor. The function of the fixed blades 4 of Maruyama et al. is as follows.

Col. 3, lines 19-29, of Maruyama et al states:

As shown in FIGS. 3 and 7, the movable blades 7 rotate in the direction shown by an arrow *r* in the figures, resulting in the generation of an air stream as shown by an arrow *a*. It will be understood that by the existence of the fixed blades 4 and 9 the airflow could be increased.

The fixed blades 4 of Maruyama et al. do not amount to disclosing a guard plate such as the finger guard. Even if the fixed blades of Maruyama et al. were applied to the plurality of bars of Branson, the area of the circular opening 3 in the Maruyama et al. device would decrease due to the plurality of bars, because the plurality of bars would be formed in the circular opening 3 in the base plate 1. As a result, the amount of airflow exhausted from the circular opening 3 would decrease, which obviously would decrease the cooling efficiency of the fan motor of Maruyama et al. to a remarkable extent.

On the other hand, the guard plate of the present invention functions as a *finger guard* as explained above.

It is respectfully submitted, therefore, the fixed blades of Maruyama et al. are different from the structure, function and effect of the present invention. Consequently, the structure of Maruyama et al. is not included in the technical scope of the present invention, nor does the structure of Maruyama et al. relate to that of the present invention.

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The fixed blades 4 of Maruyama et al. are arranged in positions that are rotationally symmetrical to each other, and are inclined in the same direction with respect to the rotational axis. And the bars disclosed in Branson are all inclined in the same direction with respect to lines extending each bar. In other words, the shape of the cross section of each bar is the same in the Branson configuration.

On the other hand, the direction of the inclined side of the ribs according to the present invention is aligned with the direction of the airflow flowing spirally from the front of the fan. Each of the ribs of the present invention features the inclined side, each of whose gradient angle differs from that of the other.

That is, in the present invention the inclined sides of the ribs are not arranged in positions rotationally symmetrical to each other, and the shape of the cross section of each bar with respect to a line extending each bar is not identical.

The present invention achieves minimization of the airflow caused by the finger guard, which increases the airflow efficiency and cooling efficiency without sacrificing the function of the finger guard.

Therefore, the structure of the ribs of the present invention is clearly different from the structures taught by Maruyama et al. and Branson. For at least this reason, the fixed blades of Maruyama et al. and the plurality of bars of Branson function differently than, and produce different results from, the present invention. The structures of Maruyama et al. and Branson are not within the technical scope of the present invention.

Accordingly, Applicant respectfully asserts that the present invention is one that person having ordinary skill in the art would not be able to arrive at without inventive effort.

Claim 4: Maruyama et al. '271 as modified by Branson '460, further in view of McAnally et al. '566

Claim 6: Maruyama et al. '271 as modified by Branson '460, further in view of Price '534

Claims 4 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al. as modified by Branson, referenced and discussed above, and with regard to claim 4, further in view of U.S. Pat. No. 5,788,566 to McAnally et al., while with regard to claim 6, further in view of U.S. Pat. No. 3,481,534 to Price.

Because claims 4 and 6 depend from an independent claim 1 that for the above-mentioned reasons is believed to be allowable, the rejection of these claims by extension over McAnally et al. and Price has been rendered moot.

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Claim 7-11 and 13; McAnally et al. '566 in view of Maruyama et al. '271, further in view of Branson '460

Claim 12; McAnally et al. '566 as modified by Maruyama et al. '271 as modified by Branson '460, and in view of Price '534

Claims 7-11 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over McAnally et al. in view of Maruyama et al., and further in view of Branson, each of which patents has been referenced and discussed above.

Claim 12 was rejected under 35 U.S.C. 103(a) as being unpatentable over McAnally et al. as modified by Maruyama et al. as modified by Branson, and in view of Price, each of which patents has been referenced and discussed above.

Independent claim 7 is directed to, and independent claim 13 includes, a case provided with, as a guard plate, a finger guard as recited in claim 1. Claims 7 and 13 have been amended in the same manner that claim 1 has been amended, and thus for the foregoing reasons presented in discussing the rejections of claim 1, should be allowable over the prior art or record.

In particular, as argued above, the structure of Maruyama et al. does not relate to the present invention. Applicant respectfully asserts, therefore, that even by a person of ordinary skill in the prior art the present invention could not be arrived at from either the primary references—Maruyama et al. and Branson—nor from these references in combination with the other references cited secondarily in rejecting claims 7 and 13.

Furthermore, because claims 8-12 depend from an independent claim 7 that for the above-mentioned reasons is believed to be allowable, the rejection of these claims by extension over McAnally et al. and Price has been rendered moot.

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A response to this Office Action was due by September 24, 2005, and consequently a Petition for Extension of Time, along with a credit-card payment authorization form, is attached hereto. Please consider this Amendment as timely filed.

Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

October 24, 2005



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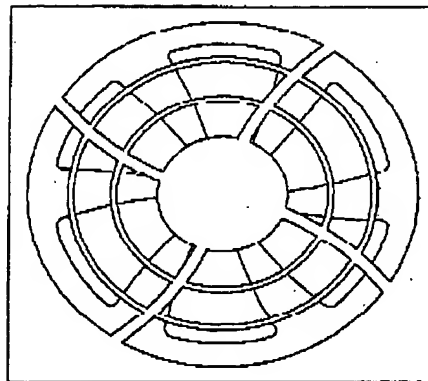


FIG. 13A

Legend
added



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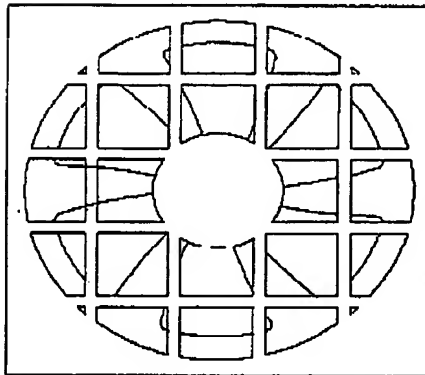


FIG. 13B

Legend
added

Prior Art